IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANTS: Frank Haase	§	Group Art Unit: 1797
	§	
SERIAL NO.: 10/521,838	§	Examiner: Ellen M. McAvoy
	§	
FILED: January 19, 2005	§	Atty. Docket: TS8578US
	§	
TITLE: "Process for Reducing Corrosion in a Condensing Boiler Burning Liquid Fuel"	§	Confirmation No.: 2392
	§	
	§	

BRIEF FOR APPELLANT

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

TABLE OF CONTENTS

Table of Contents	2
Real Party in Interest	3
Related Appeals and Interferences	3
Status of Claims	3
Status of Amendments	3
Summary of the Claimed Subject Matter	3
Grounds of Rejection to Be Reviewed on Appeal	5
Argument	5
Claims Appendix	19
Evidence Appendix	22
Related Proceedings Appendix	23

REAL PARTY IN INTEREST

The real party in interest in this appeal is Shell Oil Company.

RELATED APPEALS AND INTERFERENCES

Appellant, its legal representative, and its assignee are unaware of any other appeals or interferences that will directly affect or be directly affected by or have a bearing on the Board's decision in this pending appeal.

STATUS OF CLAIMS

Claims 1-10 have been canceled and claims 11-26 stand rejected.

The following groups of claims are appealed:

I. Group I: claims 11-26;

II. Group II: claim 18; and,

III. Group III: claim 19.

STATUS OF AMENDMENTS

All amendments have been entered.

SUMMARY OF CLAIMED SUBJECT MATTER

The claims provide "a condensing boiler solution for regions not equipped with a natural gas supply grid." Specification, p. 2, ll. 16-18.

Independent claim 11 relates to a process for reducing corrosion in a condensing boiler burning liquid fuel. Specification, p. 2, ll. 3-34. The process comprises: supplying liquid fuel comprising Fischer-Tropsch derived fuel to the condensing boiler; combusting the liquid fuel under conditions effective to produce heated combustion gas; subjecting a heat exchange fluid to the heated combustion gas under conditions effective to heat the heat exchange fluid and to cool the heated combustion gas, thereby producing a liquid condensate; and, channeling the liquid condensate away from the condensing boiler, the channeling equipment exhibiting reduced corrosion compared to corrosion experienced burning a standard industrial gas oil fuel using the same condensing boiler

under the same conditions. Specification: p. 3, ll. 15- p. 4 l. 3; p. 1, ll. 6-22; p. 2, ll. 27-29; and Example 1, p. 7, ll. 18-p. 8, l. 7.

Dependent claim 18 also is directed to a process for reducing corrosion in a condensing boiler burning liquid fuel. Specification, p. 2, ll. 3-34. The process comprises: supplying liquid fuel comprising Fischer-Tropsch derived fuel to the condensing boiler; combusting the liquid fuel under conditions effective to produce heated combustion gas; subjecting a heat exchange fluid to the heated combustion gas under conditions effective to heat the heat exchange fluid and to cool the heated combustion gas, thereby producing a liquid condensate; and, channeling the liquid condensate away from the condensing boiler, the channeling equipment exhibiting reduced corrosion compared to corrosion experienced burning a standard industrial gas oil fuel using the same condensing boiler under the same conditions. Specification: p. 3, ll. 15- p. 4 l. 3; p. 1, ll. 6-22; p. 2, ll. 27-29; and Example 1, p. 7, ll. 18-p. 8, l. 7. Dependent claim 18 also specifies "further comprising supplying the Fischer-Tropsch derived fuel comprising a Fischer-Tropsch product which contains more than 80 wt % of iso and normal paraffins, less than 1 wt % aromatics, less than 5 ppm sulfur and less than 1 ppm nitrogen and wherein the density of the Fischer-Tropsch product is between 0.65 and 0.8 g/cm^3 at 15°C." Specification, p. 5, ll. 22-p. 6, l. 2.

Dependent claim 19 is directed to a process for reducing corrosion in a condensing boiler burning liquid fuel. Specification, p. 2, ll. 3-34. The process comprises: supplying liquid fuel comprising Fischer-Tropsch derived fuel to the condensing boiler; combusting the liquid fuel under conditions effective to produce heated combustion gas; subjecting a heat exchange fluid to the heated combustion gas under conditions effective to heat the heat exchange fluid and to cool the heated combustion gas, thereby producing a liquid condensate; and, channeling the liquid condensate away from the condensing boiler, the channeling equipment exhibiting reduced corrosion compared to corrosion experienced burning a standard industrial gas oil fuel using the same condensing boiler under the same conditions. Specification: p. 3, ll. 15- p. 4 l. 3; p. 1, ll. 6-22; p. 2, ll. 27-29; and Example 1, p. 7, ll. 18-p. 8, l. 7. Dependent claim 19 specifies, "further comprising supplying the Fischer-Tropsch derived

fuel comprising more than 80 wt % of a Fischer-Tropsch product." Specification, p. 6, l. 16.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Whether claims 11-26 are obvious under 35 U.S.C. § 103(a) over Jahier et al (EP 0 789 203 A1, hereafter "Jahier") in combination with U. S. Patent No. 5,689,031 to Berlowitz et al ("Berlowitz") or U. S. Patent No. 6,296,757 to Wittenbrink et al. ("Wittenbrink");

2. Whether claim 18 is obvious under 35 U.S.C. § 103(a) over Jahier in combination with Berlowitz or Wittenbrink; and,

3. Whether claim 19 is obvious under 35 U.S.C. § 103(a) over Jahier in combination with Berlowitz or Wittenbrink.

ARGUMENT

The claims provide "a condensing boiler solution for regions not equipped with a natural gas supply grid." Specification, p. 2, ll. 16-18.

"Condensing boilers" typically are used to heat water for commercial or domestic applications, such as space heating and domestic water heating. Specification, p. 1, ll. 3-5. Condensing boilers normally burn **natural gas** as fuel. Specification, p. 1, l. 23 (emphasis added). As explained in EP 0 789 203 A1 to Jahier et al ("Jahier"),

> it is known that ***gas*-fired boilers** have become wide-spread in the field of heating systems; **these boilers are known as *condensing boilers*** because the gases produced by combustion are cooled inside them until the water vapor contained therein condenses, so as to recover the latent condensation heat and transfer it to the water to be heated, which flows through said boilers.

Jahier, col. 1, ll. 5-11 (emphasis added).

The Netherlands is equipped with a wide spread natural gas grid. Many households in the Netherlands use a condensing boiler for domestic heating in combination with warm water supply. The wide application of condensing boilers, at least in the Netherlands, is due to their attractive energy efficiency and the presence of the natural gas supply grid. Specification, p. 1, l. 24-p. 2 l. 2.

A disadvantage of condensing boilers is that they cannot be easily applied in regions where no natural gas grid is present. Specification, p. 2, ll. 3-5.

Natural gas is known to be a relatively clean burning fuel. Although liquid fuel, such as industrial gas oil, could be transported to and stored by the end user of a condensing boiler, burning industrial gas oil in a condensing boiler produces condensate liquid by-products that are much more corrosive than those produced burning natural gas. In order to burn industrial gas oil, the condensing boiler would have to be made from different, more corrosion resistant, materials. Specification, p. 2, ll. 5-10. *See, e.g.*, EP-A-699872 (use of carbon materials to avoid corrosion), DE-A-3434415 (cooling of flue gasses against combustion air in a heat exchanger made of corrosive resistant material); . and, DE-A-3238762.

It would be desirable to use condensing boilers to burn liquid fuel without the need to provide different, more corrosion resistant materials in the condensing boiler. Specification, p. 2, ll. 7-15. **The claims provide a simple but elegant solution to this problem--supplying liquid fuel comprising Fischer-Tropsch derived fuel to the condensing boiler.**

Appellants determined that the corrosive nature of the condensate liquid by-product produced burning liquid fuel comprising Fischer-Tropsch ("F-T") derived fuel is lower than the corrosive nature of the condensate liquid by-product produced burning liquid (low-sulphur) industrial gas oil (IGO). Specification, p. 2, ll. 21-29. Appellants also determined that a condensing boiler that normally burns natural gas for fuel also can be used for liquid fuel firing with only minor adjustments.[1] Specification, p. 2, ll. 23-33. The body of the claims specifies that the channeling equipment of the condensing boiler, which channels the liquid condensate from the combustion of the liquid fuel comprising F-T derived fuel away from the condensing boiler, exhibits reduced corrosion compared to corrosion experienced burning a standard industrial gas oil fuel using the same condensing boiler under the same conditions.

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[1] For example, as seen in Figure 1, it may be necessary to modify existing condensing boilers to add an oil pump 12 to supply the Fischer-Tropsch fuel and to add an expansion vessel 13. Specification, p. 4, ll. 1-2. These small modifications to existing burners are much less cumbersome than, for example, applying different materials for various surfaces of the condensing boiler that contact the condensate, such as heat exchanging surfaces of the condensing boiler and/or the chimney. Specification, p. 2, ll. 29-33.

The claimed process not only allows the use of condensing boilers to burn liquid fuel without having to provide different, more corrosion resistant materials in the condensing boiler, the claimed process also produces less NO_x emissions, less hydrocarbon emissions, less carbon monoxide emissions, and less odor than would burning an Industrial Gas Oil in the condensing burner. Specification, p. 3, ll. 1-8. F-T derived fuels also are very stable over storage for a prolonged period of time, and are biodegradable and environmentally friendly. Specification, p. 3, l. 9-14.

I. Whether claims 11-26 are obvious under 35 U.S.C. § 103(a) over Jahier in combination with Berlowitz or Wittenbrink

The examiner rejects claims 11-26 as obvious under 35 U.S.C. § 103 over Jahier in combination with Berlowitz or Wittenbrink. The examiner contends that Jahier describes a gas condensing boiler meeting the limitations of the claims, and that Berlowitz and/or Wittenbrink disclose Fischer-Tropsch derived diesel fuel meeting the limitations of the liquid fuel in the claims. The examiner finds that gas condensing boilers were known, and that "clean" Fischer Tropsch derived fuels were "conventional in the art, " (Final action, p. 2-3). The examiner concludes that

> having the prior art references before the inventor at the time the invention was made it would have been obvious to have used a conventional fuel such as the clean distillate fuel taught by either Berlowitz or Wittenbrink in the condensing boiler of Jahier. As recently instructed by the Supreme Court, when a claim defines a combination of elements known in the prior art, the combination must do more than yield a predictable result. *KSR Int'l Co. v. Teleflex, Inc.*, 127 S.Ct. 1727, 1740 (2007).

Final action, p. 3. The examiner erroneously contends that "[t]he language 'for reducing corrosion in a condensing boiler burning fuel' . . . occurs [only] in the preamble." Final action, pp. 3-4. Based on this erroneous contention, the examiner states that the limitation has not been given patentable weight.

A. The examiner has not met her burden to establish that claims 11-26 are obvious

The examiner has not met her burden to establish that claims 11-26 are obvious over the cited references. *In re Oetiker*, 24 U.S.P.Q.2d 1443 (Fed. Cir. 1992).

As seen from the following discussion, the examiner has not met the flexible TSM test. *Ortho-McNeil Pharmaceutical, Inc. v. Mylan Laboratories, Inc., et al.*, 86 U.S.P.Q.2d 1196, 1201-02 (Fed. Cir. 2008). The examiner has not established that supplying liquid F-T derived fuel to a condensing boiler is the predictable use of known elements according to their established functions. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 127 S.Ct. 1727, 82 U.S.P.Q.2d 1385, 1396 (U.S. 2007). The examiner has not established an apparent reason to modify Jahier in the fashion claimed. *Id.* And, the evidence of record weighs against the examiner's unsupported conclusion of obviousness.

1. The references

Jahier describes a gas condensing boiler comprising a "gas burner" comprising a "combustion chamber . . . supplied through the pipe 3b" and designed to produce "heat exchange between the gases produced by the burner and the water contained inside the elements 1 and 2." Jahier, col. 2, ll. 42-49. According to Jahier:

> [t]he main feature of the invention . . . resides in the fact that each of the one or two elements has means which are adapted to convey a portion of the incoming cold water directly towards the upper region which is proximate to the combustion chamber 3 and a portion of said water directly downwards, i.e., proximate to the condensing region, so as to meet, in a[n] optimum manner, the

dual requirement of protecting said combustion chamber and of causing an active condensation of the water vapor contained in the gases.

Jahier, col. 3, ll. 5-15.

Berlowitz states that "[c]lean distillate useful as a diesel fuel or diesel blending stock is produced from Fischer-Tropsch wax by separating wax into heavier and lighter fractions; further separating the lighter fraction and hydroisomerizing the heavier fraction and that portion of the light fraction below about 500°F. The isomerized product is blended with the untreated portion of the lighter fraction." Berlowitz, abstract.

Wittenbrink describes "[d]iesel fuels or blending stocks having excellent lubricity, oxidative stability and high cetane number . . . produced from non-shifting Fischer-Tropsch processes." Wittenbrink, abstract.

2. At most, the examiner has established that condensing boilers and F-T derived fuels were *independently* known in the prior art

At most, the examiner has established that condensing boilers and F-T derived fuel both were **independently** known in the prior art. However, as best explained in *KSR*, "[a] patent composed of several elements is ***not proved obvious* merely by demonstrating that each of its elements was, *independently*, known in the prior art**." *Id.* (emphasis added). *KSR Int'l Co. v. Teleflex Inc.*, 82 U.S.P.Q.2d at 1396.

3. The examiner has not met the flexible TSM test

The Federal Circuit more recently affirmed that the "**flexible TSM test remains the primary guarantor against a non-statutory hindsight analysis**." *Ortho-McNeil Pharmaceutical, Inc. v. Mylan Laboratories, Inc., et al.*, 86 U.S.P.Q.2d at 1201-02. The examiner has not pointed to a teaching or suggestion in any cited reference, or elsewhere, to supply a condensing boiler with a fuel comprising liquid F-T derived fuel. The examiner has not met the flexible TSM test.

4. The examiner has not established that the pending claims are directed to the predictable use of known elements according to their established functions

The examiner also has not established that supplying liquid F-T derived fuel to a condensing boiler is the predictable use of known elements according to their established functions. *KSR Int'l Co. v. Teleflex Inc.*, 82 U.S.P.Q.2d at 1396.

The examiner has not established that combusting liquid fuel comprising F-T derived fuel in a condensing boiler was an **established function** of liquid fuel comprising F-T derived fuel. The examiner has not established that it was **predictable** that "condensing boilers," **which normally burn natural gas as fuel**, could be used to burn liquid fuel comprising F-T derived fuel with only minor adjustments. *Id. See also In re Vaeck*, 20 U.S.P.Q.2d 1438, 1442 (Fed. Cir. 1991)(Board must consider whether prior art would have revealed that those of ordinary skill had a reasonable expectation of success in carrying out claimed process). The examiner has not established that it was **predictable** that condensing boilers burning liquid fuel comprising F-T derived fuel would "exhibit reduced corrosion compared to corrosion experienced burning a standard industrial gas oil fuel using the same condensing boiler under the same conditions." *Id.* The examiner certainly has not established that it was predictable that the reduced corrosion would permit the "condensing boiler" to burn liquid fuel comprising F-T derived fuel without the need to provide a condensing boiler comprising different, more corrosion resistant materials. *Id.*

5. The examiner has not established an apparent reason to combine the cited references in the fashion claimed

The examiner does not point to anything in Berlowitz, Wittenbrink, or elsewhere, that establishes an apparent reason to combine known elements **in the fashion of claims 11-26**. *Id.*

6. The evidence contradicts the examiner's position

In addition to the foregoing, the specification (p. 2, ll. 5-10) and U.S. Patent No. 6,540,505 to Wuest (discussed at p. 4 of Response to Final Action filed 6-22-09) provide evidence that it is **not predictable** whether a burner designed to burn one type of fuel will efficiently and effectively burn a different type of fuel.

As explained in the specification, in order to burn liquid industrial gas oil, condensing boilers would have to be made from different, more corrosion resistant, materials. Specification, p. 2, ll. 5-10, citing: EP-A-699872 (use of carbon materials to avoid corrosion); DE-A-3434415 (cooling of flue gasses against combustion air in a heat exchanger made of corrosive resistant material); and, DE-A-3238762. The foregoing weighs against the examiner's unsupported conclusion that "it would have been obvious to have used a conventional fuel such as the clean distillate fuel taught by either Berlowitz or Wittenbrink in the condensing boiler of Jahier." Final action, p.3.

Additional evidence weighing against the examiner's unsupported conclusion is found in Wuest. Discussing the use of extra light heating oil rather than kerosene in an evaporator burner, Wuest explains that:

> With kerosene or petroleum as fuel, it is possible, during burner start-up, to heat the kerosene or petroleum to the vaporization temperature in the vaporizing chamber by means of an electric heating device, but to subsequently switch off the electric heating device when the heating device together with the burner has been heated up to such an extent that the vaporization of the kerosene or petroleum is maintained by the sensible heat of the heating device. ***With extra light heating oil*, however, *continuous operation of the electric heating device is necessary* on account of the much higher vaporization temperature with this fuel.**

Wuest, col. 1, ll. 51-62 (emphasis added).[2]

The foregoing evidence weighs against the examiner's unsupported conclusion that "it would have been obvious to have used a conventional fuel such as the clean distillate fuel taught by either Berlowitz or Wittenbrink in the condensing boiler of Jahier." Final action, p. 3.

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[2] Wuest attempts to solve this problem by **modifying the burner**. See Wuest, *e.g.*, col. 2, ll. 25-43.

7. The Rejection of claims 11-26 should be reversed

The claims provide "a condensing boiler solution for regions not equipped with a natural gas supply grid." Specification, p. 2, ll. 16-18. As seen from the foregoing, the examiner has not met the flexible TSM test, and has not established that the claims are directed to the predictable use of known elements according to their established functions. The examiner has not established an apparent reason to modify Jahier in the fashion claimed. And, the evidence of record weighs against the examiner's unsupported conclusion of obviousness.

Appellant respectfully requests that the rejection of claims 11-26 be reversed.

II. Whether claim 18 is obvious under 35 U.S.C. § 103(a) over Jahier in combination with Berlowitz or Wittenbrink

Claim 18 depends from claim 11 and is allowable for all of the reasons discussed above. Claim 18 also specifies supplying to the condensing boiler "Fischer-Tropsch derived fuel comprising a Fischer-Tropsch product which contains more than 80 wt % of iso and normal paraffins, less than 1 wt % aromatics, less than 5 ppm sulfur and less than 1 ppm nitrogen and wherein the density of the Fischer-Tropsch product is between 0.65 and 0.8 g/cm^3 at 15°C."

The examiner has not pointed to a teaching or suggestion in Jahier, or elsewhere, to supply a condensing boiler with a fuel comprising liquid F-T derived fuel meeting the additional limitations of claim 18. The examiner has not met the flexible TSM test with respect to claim 18. *Ortho-McNeil Pharmaceutical,* 86 U.S.P.Q.2d at 1201-02. The examiner has not established that claim 18 is directed merely to "the **predictable** use of prior art elements according to their **established** functions." *KSR Int'l Co. v. Teleflex Inc.*, 82 U.S.P.Q.2d at 1396 (emphasis added). The examiner has not pointed to anything in Berlowitz, Wittenbrink, or elsewhere, that establishes an apparent reason to combine known elements **in the fashion of claim 18**. *Id.*

Appellant respectfully requests that the rejection of claim 18 be reversed for these additional reasons.

III. Whether claim 19 is obvious under 35 U.S.C. § 103(a) over Jahier in combination with Berlowitz or Wittenbrink

Claim 19 depends from claim 11 and is allowable for all of the reasons discussed above. Claim 19 also specifies "supplying the Fischer-Tropsch derived fuel comprising more than 80 wt % of a Fischer-Tropsch product.

The examiner has not pointed to a teaching or suggestion in Jahier, or elsewhere, to supply a condensing boiler with a fuel comprising liquid F-T derived fuel meeting the additional limitations of claim 19. The examiner has not met the flexible TSM test with respect to claim 19. *Ortho-McNeil Pharmaceutical,* 86 U.S.P.Q.2d at 1201-02. The examiner has not established that claim 19 is directed merely to "the **predictable** use of prior art elements according to their **established** functions." *KSR Int'l Co. v. Teleflex Inc.*, 82 U.S.P.Q.2d at 1396 (emphasis added). The examiner has not pointed to anything in Berlowitz, Wittenbrink, or elsewhere, that establishes an apparent reason to combine known elements **in the fashion of claim 19**. *Id.*

Appellant respectfully requests that the rejection of claim 19 be reversed for these additional reasons.

CONCLUSION

Summarizing:

1. "Condensing boilers" typically are used to heat water for commercial or domestic applications, such as space heating and domestic water heating. Specification, p. 1, ll. 3-5.

2. Condensing boilers normally burn **natural gas** as fuel. Specification, p. 1, l. 23 (emphasis added).

3. As explained in EP 0 789 203 A1 to Jahier et al ("Jahier"),

> it is known that ***gas*-fired boilers** have become wide-spread in the field of heating systems; **these boilers are known as *condensing boilers*** because the gases produced by combustion are cooled inside them until the water vapor contained therein condenses, so as to recover the latent condensation heat and transfer it to the water to be heated, which flows through said boilers.

Jahier, col. 1, ll. 5-11 (emphasis added).

4. The Netherlands is equipped with a wide spread natural gas grid. Many households in the Netherlands use a condensing boiler for domestic heating in combination with warm water supply.

5. The wide application of condensing boilers, at least in the Netherlands, is due to their attractive energy efficiency and the presence of the natural gas supply grid. Specification, p. 1, l. 24-p. 2 l. 2.

6. A disadvantage of condensing boilers is that they cannot be easily applied in regions where no natural gas grid is present. Specification, p. 2, ll. 3-5.

7. The claims provide "a condensing boiler solution for regions not equipped with a natural gas supply grid." Specification, p. 2, ll. 16-18.

8. Natural gas is known to be a relatively clean burning fuel.

9. Although liquid fuel, such as industrial gas oil, could be transported to and stored by the end user of a condensing boiler, burning industrial gas oil in a condensing boiler produces condensate liquid by-products that are much more corrosive than those produced burning natural gas.

10. In order to burn industrial gas oil, the condensing boiler would have to be made from different, more corrosion resistant, materials. Specification, p. 2, ll. 5-10, citing, EP-A-699872 (use of carbon materials to avoid corrosion), DE-A-3434415 (cooling of flue gasses against combustion air in a heat exchanger made of corrosive resistant material); and, DE-A-3238762.

11. It would be desirable to use condensing boilers to burn liquid fuel without the need to provide different, more corrosion resistant materials in the condensing boiler. Specification, p. 2, ll. 7-15.

12. The claims solve this problem by supplying liquid fuel comprising Fischer-Tropsch derived fuel to the condensing boiler.

13. Appellants determined that the corrosive nature of the condensate liquid by-product produced burning liquid fuel comprising Fischer-Tropsch ("F-T") derived fuel is lower than the corrosive nature of the condensate liquid by-product produced burning liquid (low-sulphur) industrial gas oil (IGO). Specification, p. 2, ll. 21-29.

14. Appellants also determined that a condensing boiler that normally burns natural gas for fuel also could be used for liquid fuel firing with only minor adjustments. Specification, p. 2, ll. 23-33.

15. The body of claim 11 specifies that the channeling equipment of the condensing boiler, which channels the liquid condensate from the combustion of the liquid fuel comprising F-T derived fuel away from the condensing boiler, exhibits reduced corrosion compared to corrosion experienced burning a standard industrial gas oil fuel using the same condensing boiler under the same conditions.

16. The claimed process also produces less NO_x emissions, less hydrocarbon emissions, less carbon monoxide emissions, and less odor than would burning an Industrial Gas Oil in the condensing burner. Specification, p. 3, ll. 1-8.

17. F-T derived fuels are very stable over storage for a prolonged period of time, and are biodegradable and environmentally friendly. Specification, p. 3, l. 9-14.

18. The examiner rejects claims 11-26 as obvious under 35 U.S.C. § 103 over EP 0 789 203 A1 to Jahier et al ("Jahier") in combination with U.S. Patent No. 5,689,031 to Berlowitz et al ("Berlowitz") or U.S. Patent No. 6,296,757 to Wittenbrink ("Wittenbrink").

19. The examiner contends that Jahier describes a gas condensing boiler meeting the limitations of the claims, and that Berlowitz and/or Wittenbrink disclose Fischer-Tropsch derived diesel fuel meeting the limitations of the liquid fuel in the claims. The examiner finds that gas condensing boilers were known, and that "clean" Fischer Tropsch derived fuels were "conventional in the art. " (Final action, p. 2-3).

20. The examiner concludes that

> having the prior art references before the inventor at the time the invention was made it would have been obvious to have used a conventional fuel such as the clean distillate fuel taught by either Berlowitz or Wittenbrink in the condensing boiler of Jahier. As recently instructed by the Supreme Court, when a claim defines a combination of elements known in the prior art, the combination must do more than yield a predictable result. *KSR Int'l Co. v. Teleflex, Inc.*, 127 S.Ct. 1727, 1740 (2007).

Final action, p. 3.

21. Jahier describes a gas condensing boiler comprising a "gas burner" comprising a "combustion chamber . . . supplied through the pipe 3b" and designed to produce "heat exchange between the gases produced by the burner and the water contained inside the elements 1 and 2." Jahier, col. 2, ll. 42-49.

22. Berlowitz states that "[c]lean distillate useful as a diesel fuel or diesel blending stock is produced from Fischer-Tropsch wax by separating wax into heavier and lighter fractions; further separating the lighter fraction and hydroisomerizing the heavier fraction and that portion of the light fraction below about 500°F. The isomerized product is blended with the untreated portion of the lighter fraction." Berlowitz, abstract.

23. Wittenbrink describes "[d]iesel fuels or blending stocks having excellent lubricity, oxidative stability and high cetane number . . . produced from non-shifting Fischer-Tropsch processes." Wittenbrink, abstract.

24. At most, the examiner has established that condensing boilers and F-T derived fuel were **independently** known in the prior art.

25. The examiner has not pointed to a teaching or suggestion in any cited reference, or elsewhere, to supply a condensing boiler with a fuel comprising liquid F-T derived fuel.

26. The examiner has not established that combusting liquid fuel comprising F-T derived fuel in a condensing boiler was an **established function** of liquid fuel comprising F-T derived fuel.

27. The examiner has not established that it was **predictable** that "condensing boilers," **which normally burn natural gas as fuel**, could be used to burn liquid fuel comprising F-T derived fuel with only minor adjustments.

28. The examiner has not established that it was **predictable** that condensing boilers burning liquid fuel comprising F-T derived fuel would "exhibit reduced corrosion compared to corrosion experienced burning a standard industrial gas oil fuel using the same condensing boiler under the same conditions."

29. The examiner certainly has not established that it was predictable that the reduced corrosion would permit the "condensing boiler" to burn liquid fuel comprising F-T derived fuel without the need to provide a condensing boiler comprising different, more corrosion resistant materials.

30. The examiner does not point to anything in Berlowitz, Wittenbrink, or elsewhere, that establishes an apparent reason to combine known elements in the fashion of claims 11-26. *Id.*

31. The evidence of record establishes that, in order to burn liquid industrial gas oil, condensing boilers are made from different, more corrosion resistant, materials. Specification, p. 2, ll. 5-10. *See, e.g.*, EP-A-699872 (use of carbon materials to avoid corrosion), DE-A-3434415 (cooling of flue gasses against combustion air in a heat exchanger made of corrosive resistant material) and, DE-A-3238762.

32. The evidence of record also includes U.S. Patent No. 6,540,505 to Wuest ("Wuest"), which discusses the use of extra light heating oil rather than kerosene in an evaporator burner.

33. Wuest explains that:

> With kerosene or petroleum as fuel, it is possible, during burner start-up, to heat the kerosene or petroleum to the vaporization temperature in the vaporizing chamber by means of an electric heating device, but to subsequently switch off the electric heating device when the heating device together with the burner has been heated up to such an extent that the vaporization of the kerosene or petroleum is maintained by the sensible heat of the heating device. *With extra light heating oil*, however, *continuous operation of the electric heating device is necessary* on account of the much higher vaporization temperature with this fuel.

Wuest, col. 1, ll. 51-62 (emphasis added).

34. The evidence of record contradicts the examiner's unsupported conclusion that "it would have been obvious to have used a conventional fuel such as the clean distillate fuel taught by either Berlowitz or Wittenbrink in the condensing boiler of Jahier." Final action, p. 3.

35. Claim 18 specifies supplying to the condensing boiler "Fischer-Tropsch derived fuel comprising a Fischer-Tropsch product which contains more than 80 wt % of iso and normal paraffins, less than 1 wt % aromatics, less than 5 ppm sulfur and less than 1 ppm nitrogen and wherein the density of the Fischer-Tropsch product is between 0.65 and 0.8 g/cm^3 at 15°C."

36. The examiner has not pointed to a teaching or suggestion in Jahier to supply to a condensing boiler liquid fuel comprising F-T derived fuel meeting the limitations of claim 18 in the cited references or elsewhere.

37. The examiner has not pointed to anything in Berlowitz, Wittenbrink, or elsewhere that establishes an apparent reason to combine known elements in the fashion of claim 18.

38. Claim 19 specifies, "supplying the Fischer-Tropsch derived fuel comprising more than 80 wt % of a Fischer-Tropsch product."

39. The examiner has not pointed to a teaching or suggestion in Jahier to supply to a condensing boiler liquid fuel comprising more than 80 wt % of a Fischer-Tropsch product.

40. The examiner has not pointed to anything in Berlowitz, Wittenbrink, or elsewhere that establishes an apparent reason to combine known elements in the fashion of claim 19.

Applicant respectfully requests that the rejection of claims 11-26 be reversed for all of the foregoing reasons. The examiner is hereby authorized to charge any fees, and to deposit any overpayment of fees, to Deposit Account No. **19-1800 (File no.TS8578)**, maintained by Shell Oil Company.

Respectfully submitted,

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANTS: Frank Haase	§	**Group Art Unit: 1797**
	§	
SERIAL NO.: 10/521,838	§	**Examiner: Ellen M. McAvoy**
	§	
FILED: January 19, 2005	§	**Atty. Docket: TS8578US**
	§	
TITLE: "Process for Reducing Corrosion in a Condensing Boiler Burning Liquid Fuel"	§	**Confirmation No.: 2392**
	§	
	§	

CLAIMS APPENDIX

1-10. Canceled.

11. A process for reducing corrosion in a condensing boiler burning liquid fuel, the process comprising:

supplying liquid fuel comprising Fischer-Tropsch derived fuel to the condensing boiler;

combusting the liquid fuel under conditions effective to produce heated combustion gas;

subjecting a heat exchange fluid to the heated combustion gas under conditions effective to heat the heat exchange fluid and to cool the heated combustion gas, thereby producing a liquid condensate; and,

channeling the liquid condensate away from the condensing boiler, the channeling equipment exhibiting reduced corrosion compared to corrosion experienced burning a standard industrial gas oil fuel using the same condensing boiler under the same conditions.

12. The process of claim 11 further comprising using the condensing boiler to heat water or space.

13. The process of claim 12 wherein the liquid condensate comprises a reduced iron content compared to the iron content produced by combusting an industrial gas oil fuel using the same condensing boiler under the same conditions.
14. The process of claim 12 wherein the liquid condensate comprises a reduced nickel content compared to the nickel content produced by combusting an industrial gas oil fuel using the same condensing boiler under the same conditions.
15. The process of claim 13 wherein the liquid condensate comprises a reduced nickel content compared to the nickel content produced by combusting an industrial gas oil fuel using the same condensing boiler under the same conditions.
16. The process claim 11 further comprising supplying the Fischer-Tropsch derived fuel boiling for more than 90 wt % between 160 °C. and 400 °C.
17. The process claim 11 further comprising supplying the Fischer-Tropsch derived fuel boiling for more than 90 wt % between 160 °C. and 370 °C.
18. The process of claim 11 further comprising supplying the Fischer-Tropsch derived fuel comprising a Fischer-Tropsch product which contains more than 80 wt % of iso and normal paraffins, less than 1 wt % aromatics, less than 5 ppm sulfur and less than 1 ppm nitrogen and wherein the density of the Fischer-Tropsch product is between 0.65 and 0.8 g/cm^3 at 15°C.
19. The process of claim 11 further comprising supplying the Fischer-Tropsch derived fuel comprising more than 80 wt % of a Fischer-Tropsch product.
20. The process claim 11 further comprising providing the Fischer-Tropsch derived fuel comprising a fraction selected from the group consisting of a mineral oil fraction, a non-mineral oil fraction, and a combination thereof.
21. The process of claim 11 further comprising providing the condensing boiler with a burner selected from the group consisting of a yellow flame burner, a blue flame burner, or a combination thereof.
22. The process claim 21 further comprising operating the burner at a lambda of between 1 and 1.6

23. The process of claim 19 further comprising operating the burner at a lambda of between 1.05 and 1.2.

24. The process of claim 21 further comprising starting the burner more than three times per hour, the condensing boiler producing lower carbon dioxide emissions compared to combusting an Industrial Gas Oil using the same condensing boiler under the same conditions.

25. The process of claim 11 wherein the combustion produces lower hydrocarbon emissions compared to combusting an Industrial Gas Oil using the same condensing boiler under the same conditions.

26. The process of claim 11 wherein the combustion produces lower NO_x emissions compared to combusting an Industrial Gas Oil using the same condensing boiler under the same conditions.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANTS: Frank Haase	§	Group Art Unit: 1797
	§	
SERIAL NO.: 10/521,838	§	Examiner: Ellen M. McAvoy
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EVIDENCE APPENDIX

None.

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RELATED PROCEEDINGS APPENDIX

None.